United States
Environmental Protection Agency

Air and Radiation
Stratospheric Protection Division
6205J

Substitute Solvents Under SNAP as of June 8, 1999

SNAP Information: http://www.epa.gov/ozone/title6/snap/snap.html
Stratospheric Ozone Protection Hotline: (800) 296-1996

EPA has created the Significant New Alternatives Policy (SNAP) Program under section 612 of the Clean Air Act Amendments. SNAP evaluates alternatives to ozone-depleting substances. Substitutes are reviewed on the basis of ozone depletion potential, global warming potential, toxicity, flammability, and exposure potential as described in the March 18, 1994 final SNAP rule (59 FR 13044). Lists of acceptable and unacceptable substitutes will be updated periodically in the Federal Register. The following SNAP notices and subsequent final rules are included in this list: August 26, 1994 (59 FR 44240), January 13, 1995 (60 FR 3318), June 13, 1995 (60 FR 31092), July 28, 1995 (60 FR 38729), February 8, 1996 (61 FR 4736), May 22, 1996 (61 FR 25585), September 5, 1996 (61 FR 47012), October 16, 1996 (61 FR 54030), March 10, 1997 (62 FR 10700), June 3, 1997 (62 FR 30275) , February 24, 1998 (63 FR 9151), May 22, 1998 (63 FR 28251), January 26, 1999 (64 FR 3861), April 28, 1999 (64 FR 22981), and June 8, 1999 (64 FR 30410).

Acceptable Substitutes for Electronics Cleaning under the Significant New Alternatives Policy (SNAP) Program as of June 8, 1999

Substitute	ODS Being Replaced	Comments
Aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Semi-aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Straight organic solvent cleaning (with terpenes, C5-C20 petroleum hydrocarbons, oxygenated organic solvents such as ketones, esters, ethers, alcohols, etc.)	CFC-113, MCF	OSHA standards must be met, if applicable.
Trichloroethylene, perchloroethylene, methylene chloride	CFC-113, MCF	OSHA and RCRA standards must be met. EPA issued Maximum Achievable Control Technology requirements under the Clean Air Act for vapor degreasing in November 1994.
No-clean alternatives	CFC-113, MCF	Substitutes found acceptable include low solids fluxes and inert gas soldering.
Supercritical fluids, plasma cleaning, UV / Ozone cleaning	CFC-113, MCF	OSHA standards for ozone must be met.
Volatile methyl siloxanes	CFC-113, MCF	Approval is granted for the whole class of compounds.
Trans-1,2-dichloroethylene	CFC-113, MCF	The OSHA set exposure limit is 200 ppm.
Hydrofluorether (HFE): $C_4F_9OCH_3$ (methoxynonafluorobutane, iso and normal)	CFC-113, MCF, HCFC-141b	

Acceptable Substitutes for Metals Cleaning under the Significant New Alternatives Policy (SNAP) Program as of June 8, 1999

Substitute	ODS Being Replaced	Comments
Aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Semi-aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Straight organic solvent cleaning (with terpenes, C5-C20 petroleum hydrocarbons, oxygenated organic solvents such as ketones, esters, ethers, alcohols, etc.)	CFC-113, MCF	OSHA standards must be met, if applicable.
Trichloroethylene, perchloroethylene, methylene chloride	CFC-113, MCF	OSHA and RCRA standards must be met. EPA issued Maximum Achievable Control Technology requirements under the Clean Air Act for vapor degreasing in November 1994.
Vanishing oils	CFC-113, MCF	Depending on geographic region, may be subject to VOC controls.
Supercritical fluids	CFC-113, MCF	
Volatile methyl siloxanes	CFC-113, MCF	Approval is granted for the whole class of compounds.
Trans-1,2-dichloroethylene	CFC-113, MCF	The OSHA set exposure limit is 200 ppm.
HFC-4310mee	CFC-113, MCF, HCFC-141b	Company-set time-weighted average workplace exposure standard of 200 ppm, and a workplace exposure ceiling of 400 ppm.
Hydrofluorether (HFE): $C_4F_9OCH_3$ (methoxynonafluorobutane, iso and normal)	CFC-113, MCF, HCFC-141b	

Acceptable Substitutes for Precision Cleaning under the Significant New Alternatives Policy (SNAP) Program as of June 8, 1999

Substitute	ODS Being Replaced	Comments
Aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Semi-aqueous cleaners	CFC-113, MCF	EPA is planning to issue effluent guidelines for this industry under the Clean Water Act.
Straight organic solvent cleaning (with terpenes, C5-C20 petroleum hydrocarbons, oxygenated organic solvents such as ketones, esters, ethers, alcohols, etc.)	CFC-113, MCF	OSHA standards must be met, if applicable.
Trichloroethylene, perchloroethylene, methylene chloride	CFC-113, MCF	OSHA and RCRA standards must be met. EPA issued Maximum Achievable Control Technology requirements under the Clean Air Act for vapor degreasing in November 1994.
Supercritical fluids, plasma cleaning, UV/Ozone cleaning	CFC-113, MCF	OSHA standards for ozone must be met.
HCFC-123	CFC-113, MCF	Has an AEL of 30ppm.
Trans-1,2-dichloroethylene	CFC-113, MCF	The OSHA set exposure limit is 200 ppm.
Volatile methyl siloxanes	CFC-113, MCF	Approval is granted for the whole class of compounds.
Hydrofluorether (HFE): $C_4F_9OCH_3$ (methoxynonafluorobutane, iso and normal)	CFC-113, MCF, HCFC 141b	

Acceptable Substitutes Subject to Narrowed Use Limits under the Significant New Alternatives Policy (SNAP) Program as of June 8, 1999

Substitute	End Uses	ODS Being Replaced	Limitations	Comments
Perfluorocarbons (C5F12, C6F12, C6F14, C7F16, C8F18, C5F11NO, C6F13NO, C7F15NO, and C8F16)	Electronics cleaning / Precision cleaning	CFC-113, MCF	Acceptable for high-performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	The principal environmental characteristic of concern for PFCs is that they have long atmospheric lifetimes and high global warming potentials. Although actual contributions to global warming depend upon the quantities of PFCs emitted, the effects are for practical purposes irreversible. Users must observe this limitation on PFC acceptability by conducting a reasonable evaluation of other substitutes to determine that PFC use is necessary to meet performance or safety requirements. Documentation of this evaluation must be kept on file. .
Perfluoropolyethers	Electronics cleaning / Precision cleaning	CFC-113, MCF	Acceptable for high-performance, precision-engineered applications only where reasonable efforts have been made to ascertain that other alternatives are not technically feasible due to performance or safety requirements.	PFPEs have similar global warming profiles to the PFCs, and the SNAP decision on PFPEs parallels that for PFCs.

Acceptable Substitutes Subject to Use Conditions under the Significant New Alternatives Policy (SNAP) Program as of June 8, 1999

Substitute	End Uses	ODS Being Replaced	Conditions	Comments
Monochlorotoluenes and benzotrifluorides	All end uses	CFC-113, MCF	Subject to a 50 ppm workplace standard for monochlorotoluenes and a 100 ppm standard for benzotrifluoride.	The workplace standard for monochlorotoluenes is based on an OSHA PEL of 50 ppm for orthochlorotoluene. The workplace standard for benzotrifluorides is 100 ppm, based on the company-set acceptable exposure limit.
HFC-4310mee	Electronics cleaning / Precision cleaning	CFC-113, MCF, HCFC-141b	Subject to a 200 ppm time-weighted average workplace exposure standard and 400 ppm workplace exposure ceiling.	
HCFC-225ca / cb	Electronics cleaning / Precision cleaning	CFC-113, MCF	Subject to the company-set exposure limit of 25 ppm for the -ca isomer.	HCFC-225ca/cb is offered as an isomeric blend. The company-set workplace standard for the ca-isomer is 25 ppm and for the cb isomer 250ppm. Those of the less toxic cb-isomer suggests that the 25 ppm standard for the blend can be readily met.

Unacceptable Substitute Solvents Significant New Alternatives Policy (SNAP) Program as of June 8, 1999			
Substitute	**ODS Being Replaced**	**End Uses**	**Reason**
Dibromomethane	CFC-113, MCF	All end-uses	High ODP; other alternatives exist.
HCFC 141b and its blends	CFC-113, MCF	All end-uses	High ODP; other alternatives exist.
Chlorobromomethane	CFC-113, MCF, HCFC-141b	All end-uses	High ODP, other alternatives exist.